

solution of five drops of acetic acid in twenty cubic centimetres of distilled water, and at once again washed thoroughly in pure water. Everything in the preparation is now decolorized except the gonococci, which remain distinctly blue. It is now well to double-stain the preparation with a very dilute watery solution of safranin. The action of this color must be slight only, and be at once interrupted as soon as the cover-glass, after being washed in water, shows a trace of the safranin color when held over a white surface. Under the microscope the safranin will be distinct enough. These preparations may be permanently mounted in Canada balsam, which has been warmed on the slide without the addition of any solvent. The gonococci will be found deep blue, and the epithelial cells of the same color; while the pus cells and their nuclei are salmon-colored.

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## SURGERY.

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### UNDER THE CHARGE OF

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### TRANSFUSION.

DR. WILLIAM HUNTER (*The British Medical Journal*, July 27, Aug. 3, and Aug. 10, 1889) publishes an elaborate experimental and critical study of the value of the different forms of transfusion. The paper is by far the most valuable recent contribution to this subject, and well deserves careful study. His main conclusions as to the practice of transfusion, and the reasons therefor, are:

1. Transfused blood possesses no nutritive value. Transfusion of blood is, therefore, useless in all forms of "atrophic" anæmia, by which term, rather than by the unfortunate term "symptomatic," hitherto given, he would distinguish all forms of anæmia in which the changes in the blood simply correspond in degree to the wasting changes occurring in other tissues.

2. If the condition to be met with is a want of red corpuscles, or an incapacity on the part of those already present to carry on their respiratory functions, then transfusion of blood may possibly be of value. The red corpuscles transfused remain for a certain time within the circulation of their host. Transfusion of blood may conceivably be of value in carbonic oxide poisoning, where the red corpuscles are incapacitated for their work by a close union of the gas with the hæmoglobin of the corpuscles.

3. If the condition to be met with is a failure in blood formation, due, perhaps, to the want of iron in the system, transfusion of blood may be of some value, in so far as we in this way supply the organism with iron in the form in which it can most conveniently be stored up in the body. The two

conditions in which this disturbance is most marked are chlorosis and traumatic anemia resulting from long-continued and repeated hemorrhages. There is no disease in which transfusion of blood corpuscles is theoretically more indicated than in chlorosis. The anemia of chlorosis we can, however, readily combat without having resort to transfusion.

The question as to the advisability of transfusion in traumatic anemia is not so easily answered. Our object here is not so much to relieve any passing danger arising from insufficient bulk of fluid, or want of red corpuscles, as to stimulate blood formation. The recovery is effected with greater rapidity when simple saline solution (three per cent. solution of common salt) is injected than when blood is transfused. Dr. Hunter's experiments show that the recovery after transfusion of saline solution is remarkably rapid.

The time required for the return of the red corpuscles to their original number after loss of blood, without subsequent infusion or transfusion, varies from two to three weeks. With subsequent infusion of simple saline solution it is the same; whereas, with subsequent transfusion of blood, complete recovery is delayed a week longer or more. Further, what is perhaps more striking, and certainly is of more importance, is the fact that during the subsequent recovery the animal generally appears to be in better health after infusion of salines than after transfusion of blood.

Even in traumatic anemia resulting from long-continued losses of blood, transfusion of blood has, in all probability, no value not possessed by simple saline solution. The former may actually retard blood formation; the latter is at least always harmless, and might be beneficial if it were required.

4. Lastly, if the condition to be met in transfusing blood is a threatened failure of circulation as the result of sudden loss of blood, then it is unnecessary to have recourse to blood transfusion, as infusion of any neutral saline meets equally well, if not better, all the indications. The value possessed by transfused blood in such cases is almost solely in virtue of its physical properties. The chief physical property of blood for purposes of transfusion is undoubtedly its volume. The immediate source of danger from sudden loss of blood is the fall in the blood pressure to a point where the circulation is unable to be maintained.

The obvious indication, therefore, is to raise the pressure within the vessels. In health, the blood pressure is dependent mainly upon peripheral resistance. The effect of a loss of blood on the blood pressure is, up to a certain point, completely neutralized by an increase in the peripheral resistance, due to stimulation of the vasomotor centre. It is only after very severe hemorrhage that this relation between the vessels and the amount of fluid they contain, necessary for the carrying on of the circulation is disturbed. The readiest way in which this can be restored is to replace the lost blood with a certain bulk of fluid. To meet the danger thus arising, the quantity of blood is of more importance than its quality.

In an emergency the infusion of ordinary water (Coates) has been followed by results as successful as any ever obtained after transfusion of blood. Bulk for bulk, pure or defibrinated blood, however, must possess certain advantages over neutral saline solutions free from organic constituents. They doubtless possess a certain physiological value as well as a physical value, inasmuch as blood must have a greater and more immediate effect in restoring the tone of

the vasomotor centres than saline solutions. These advantages, however, are more than neutralized by the other and still greater advantages, namely, (1) the difficulty of obtaining blood in sufficient quantity, or with sufficient rapidity, as compared with the ease with which simple saline solutions can be prepared; (2) the dangers attending the transfusion of blood, as compared with the absolute freedom from danger possessed by solution; and (3) the doubtful value of the transfusion, whether hæmogenic or physical, when compared with saline solution.

Transfusion of blood will long continue to be practised, and its action studied, on account of the many interesting problems connected with the physiology and pathology of the blood, on which it is well fitted to throw light. For practical purposes, however, all the advantages to be gained by transfusion may be equally well and more readily obtained by infusion of a neutral saline, such as three to four per cent. solution of common salt (about one drachm to the pint). The only pressing indication for the performance of transfusion is the collapse from sudden and severe loss of blood. With regard to its performance, two points may be noted: (1) That the simpler the instruments used—a simple glass canula, with a piece of India-rubber attached, and a clean syringe—the more easily will this infusion be effected, and the less likelihood will there be of the injection of air—a source of danger to which far too much importance has long been attached, as it is also one which can readily, with a little care, be altogether avoided; (2) that the temperature of the solution should never arise above that of the body. Under no circumstances is transfusion of milk or of other mixtures possessing what are supposed to be nutritive properties, ever indicated. They possess no value not possessed by an equal bulk of saline solution.

#### THE TREATMENT OF SURGICAL SHOCK.

F. X. DERCUM (*The Medical News*, September 21, 1889) recommends the following methods of treatment in surgical shock, which he believes to be due to a more or less marked general paralysis of the nervous system:

If the surgeon is about to perform a serious operation, say trephining of the spinal canal with possible opening of the dura, a preliminary rest of several days in bed should be prescribed, to diminish general nervousness and irritability; secondly, excessive care should be used in the administration of ether, the very least possible amount being given; thirdly, etherization being complete, one-twentieth to one-tenth of a grain of strychnia should be injected hypodermatically, and repeated if necessary; fourthly, the operation being complete, and the shock established, the patient is to be at once transferred to a previously prepared hot-water bed, the head being maintained a little lower than the body. Shock continuing unabated, digitalis and atropia are next to be used hypodermatically, and at the same time musk may be injected into the bowel in the dose of fifteen to twenty grains, suspended in mucilage. If the latter is not to be obtained, warm, strong, black coffee is to be used in its stead.

The hypodermatic injection of ether he does not believe to possess much utility. If it acts at all, it must be in a reflex way by the local irritation it produces.

## THE SURGICAL ASPECT OF TUBERCULOSIS.

MR. HOWARD MARSH's lectures (*The British Medical Journal*, July 20th and 27th, August 3, 1889) on this subject, before the Royal College of Surgeons, are, as might be expected, valuable contributions to its literature, and, moreover, are marked by the careful clinical observation and sound judgment which just now are so necessary to aid in settling some of the vexed questions as to operative or non-operative treatment of tuberculous joints. In this respect the following remarks of Mr. Marsh have the greatest practical importance:

"Speaking of the general group of tubercular diseases met with in surgery, I believe that when they are detected early, and are adequately treated by prolonged rest, in not more than at the most ten per cent. do they develop to any formidable degree. It is a rule to which I have seen but few exceptions, that when, for example, a knee or an elbow, which is the seat of tubercular disease of less than three months' duration, is enclosed in well-fitted splints, and is kept at rest, the case gives no further real trouble. The symptoms begin at once to subside, and the improvement, though it is slow, goes on without material check until the joint is apparently free from disease; while, after a longer period of rest, complete recovery is secured. I am confident that the period required for treatment in early cases does not, as a rule, exceed twelve or eighteen months. I have met with many instances in which after this time no trace of disease, beyond slight muscular wasting, has remained. In more advanced cases, though the period occupied is longer, the same treatment will lead to good repair.

"The treatment adopted has been that of prolonged rest in the horizontal position, combined with weight-extension of the affected limb. This method, although, of course, it involves some important details, is, in principle, so simple and so well known that it is needless to describe it; but the method of dealing with suppuration claims more particular notice. All abscesses have been opened as soon as detected. An incision from an inch to an inch and a half in length is made, matter is evacuated by gentle pressure, and a small drainage tube, just long enough to enter the cavity, is used for two or three days. The dressing has consisted of carbolic gauze, next the wound, and this has been covered superficially with alembroth wool. The dressing is changed according to the case. In many instances the wound closes in a fortnight or three weeks, sometimes even sooner; in others it becomes a sinus, which discharges for a month or six weeks, and then heals; in others, again, suppuration remains free for several weeks, or even longer, and further openings have to be made; but at length, in a large majority of cases, the wound heals, and no further suppuration, except in a very few instances, takes place.

"I am aware that the question whether abscesses should be opened at once is still under discussion. It is well known that, if left to burst spontaneously, they often do so quietly and without accession of fever or constitutional disturbance; but they have been opened in the cases I am alluding to (1) because, as experience amply shows, if left they frequently steadily enlarge, and lead to wide infection of the surrounding structures, and to the develop-

ment of long devious sinuses, which become themselves lined with tubercular growth, and the seat of long-continued and exhausting suppuration, attended with the maintenance of a high temperature; (2) because, by the method of incision, draining, and careful dressing, these abscesses may be safely evacuated without the occurrence of those septic changes and their results— hectic, high temperature, and wasting, which formerly were so liable to be met with—so that the period and also the dangers of suppuration are very materially curtailed.

"It is true that such abscesses may be absorbed; indeed, their absorption, I believe, is more frequent than some observers might think; but this event is, after all, so rare that it ought not to be allowed to interfere with any general rule of practice.

"I am sure, from considerable experience of both methods, that evacuation by free incision and drainage is much to be preferred to aspiration; for although some abscesses, when once emptied by the aspirator, will never refill, this is not the case with the majority; the majority commonly fill up again every week or every fortnight, and at length have to be incised, while, in not a few, septic changes occur after aspiration, so that this method is certainly not materially, if it is at all, safer than the free incision I have described."

Mr. Marsh, continuing, reviews the results of excision, mentions the reduction in mortality already effected, and adds:

"I do not doubt that, as operative surgery improves, the immediate results of excision will be greatly superior to those I have referred to. This is foreshadowed by the results reported by Mr. Barker and Mr. Pollard. They will be so good, indeed, especially when the operation is performed early, that unless the results to be obtained without operation are kept well in view, excision will, as I venture to think, be much too commonly performed. It must be remembered that the mere healing of a wound does not show that an operation was the best thing for a patient, or affords any proof that it ought ever to have been undertaken. The main defect of excision will lie in the ultimate result, as regards the usefulness of the limb, when this is compared with a limb in which no operation has been performed, and in which the joint, instead of having been removed, has been restored to that considerable degree of usefulness which can generally be secured by rest. I believe it is now recognized by most surgeons that, although the immediate result of excision of the knee in children may be all that could be desired, the wound often healing by primary union, or at least very quickly, the ultimate result is unsatisfactory. The union between the bones gradually, in many instances, yields; the bones do grow imperfectly, deformity ensues, and the functions of the limb are materially interfered with. It will, I venture to think, be much the same in the case of the hip. The wound may heal by primary union, and the earlier the operation the more probable will this form of union be; but deformity will often ensue, and the limb in many cases will be weak and deficient in usefulness. In short, it will be seen in both cases alike—in the knee and in the hip—that when one of the principal joints of the lower extremity has been removed during childhood, the patient has been seriously crippled."

## SYPHILIS IN OLD AGE.

DR. ALEXANDER RENAULT reviews the subject of senile syphilis in the *Annales de Derm. et de Syph.*, March, April, May, 1889, and calls attention to the differences which characterize this form of the disease. These differences are apparent even in the course and duration of the primary sore. The chancre has at first much the same appearance as that in persons of any age, but it has a remarkable tendency to ulceration. This is a point of some importance, since it is liable to lead to an error in diagnosis, especially if the chancre be extra-genital, for it may in such cases readily be confounded with epithelioma, which is so common in old age. Cicatrization is also slow, many months sometimes elapsing before this process is complete.

Another point worthy of notice is the tardiness in the appearance of adenitis. In the adult this makes its appearance usually within a fortnight, while in the aged its development is often a matter of six or seven weeks. But it is during the secondary period that the peculiarities of senile syphilis are the most striking. The syphilitic fever is apt to be quite marked; indeed, the condition of the patient at this time is sometimes so grave as to give occasion to the diagnosis of typhoid fever, or of profound malarial infection.

The syphilides of the secondary period are distinguished by their tendency to become confluent; by their obstinacy and resistance to ordinary therapeutic measures; by the frequency of relapses, and, finally, by a remarkable proneness to assume the characteristics of tertiary eruptions. Cutaneous gummata are not uncommonly observed at this stage, and in general they appear much earlier in the aged than in adults. On the part of the nervous system the disturbances are often most marked. Disorders of sensation and motion, of the special senses of sight and hearing, and of the mental functions, are commonly met with at this period. And, finally, a profound anæmia and a most pronounced cachexia are often seen, and, indeed, may be regarded as characteristic of the secondary stage of senile syphilis.—*The Medical Record*, September 28, 1889.

## LUMBAR HERNIA.

MR. JONATHAN HUTCHINSON, JR. (*The British Medical Journal*, July 13, 1889) exhibited at the Pathological Society the only specimen of lumbar hernia in existence in London. It was obtained from an elderly and rather emaciated man, who died (from other causes) in the London Hospital. The hernia was about the size of one's fist, was situated in the left lumbar region, lying over Petit's triangle, and extending nearly from the last rib to the iliac crest, and it had existed for some years. It could be made to diminish markedly on pressure, was resonant to percussion, and had an impulse when the patient coughed. Gurgling could be detected when reduction was made, returning when the pressure was taken off. It caused the patient no pain, and hardly any inconvenience. It was naturally thought that the hernia protruded through the orthodox triangle, but it was found, on dissection, that this was not the case, as the aperture, which would admit two fingers and was circular in shape, was really situated above and to the inner side of the triangle. The protrusion was, in fact, just outside the quadratus lumborum, through the transversalis aponeurosis and the latissimus dorsi, where the

latter arises from the strong fascia covering the erector spinæ. Another interesting feature at the post-mortem examination was the absence of any peritoneal sac. The looseness of the attachments of the peritoneum in this region is well known, and is taken advantage of in certain operations, such as removing the kidney through a lateral incision. It was quite easy to make the peritoneum, by gentle pressure, protrude into the centre of the hernial tumor, and, as it was certain that it had habitually during life contained intestine, it is obvious that every time the latter was reduced the peritoneal sac must have returned with it into the abdominal cavity. Whether this feature has been present in other cases of lumbar hernia it is impossible to decide, but it is one rarely met with in connection with the more common varieties of rupture.

#### ETHER IRRIGATIONS IN STRANGULATED HERNIA.

DR. IVAN N. DRAKIN (*The Annals of Surgery*, August, 1889) eulogizes ether irrigations as an excellent means for reduction of strangulated hernia. He simply pours a teaspoonful of ether over the hernial tumor every quarter or half hour, keeping it covered with compresses during the intervals. As a rule, after three or four tablespoonfuls, the intestinal loop slips down into the abdominal cavity by itself; in some cases, however, slight pressure should be applied. In the case of incarcerated scrotal hernia, it is advisable to irrigate with a mixture of ether (twenty parts) and hyoscyamus oil (four parts). When applied sufficiently early, the method is said to give most brilliant results.

DR. A. J. BRUSTEIN (*Ibid.*) describes the case of a woman with an incarcerated umbilical hernia of the size of a man's fist, in whom, after all ordinary procedures for reduction had failed, irrigation with a small jet of ether was resorted to, taxis being continued at the same time. In three or four minutes the reduction was effected with striking ease. The action of local etherization was attributed to a rapid contraction of the intestinal wall, and to the diminution in volume of the hernial gaseous contents caused by the sudden lowering of temperature.

#### THE EXTIRPATION OF VARICES OF THE LOWER EXTREMITY.

DR. BÖNNICKEN reports (*Berliner klinische Wochenschrift*, September 23, 1889) the latest details and results of the method of total excision of varicose veins originally proposed by Madelung, in 1884, at the Congress of German Surgeons. On that occasion both Langenbeck and Schede took part in the discussion, the former opposing, the latter upholding the procedure. Since then but little attention has been paid to it by English and French surgeons. König says (1886) that he has given up the ligation and limited excision of the veins, as the best results are obtained from much more extensive operations. Riedel (1885), while deploring the tediousness of the operation, expresses the same opinion. Holtz and Schmid-Stettin (1887) recommend it, while Tillmans, Fischer, and Landerer (1888-89) speak of the certainty of return.

Bönnicken has operated on thirty-two cases, fourteen of which he now reports as remaining cured two years afterward; the others are more recent, and are not included in his statistics. In none of these was there any serious

illness or even inconvenience after the operation. The presence of ulceration was not regarded as a contraindication.

The steps of the operation are briefly: cleansing of the skin; curetting and disinfecting of the ulcer, if there be one; occasionally the latter is surrounded and isolated by an incision, and this is especially necessary if the peripheral portion of the enlarged veins runs across or into the region of ulceration. The wound then makes them easily recognizable. The limb is then allowed to hang over the edge of the table until all the subcutaneous veins stand out; an Esmarch tube is applied loosely at the upper third of the thigh, so as not to interfere with the arterial supply; the skin is again cleansed; an incision in the long axis of the extremity, and following the course of the enlarged vein (generally the long saphena), is then made. This must usually be from one and a half to two feet in length. The skin is then turned back for a hand's breadth on either side. The main trunk is seized above and below with hæmostatic forceps; the intermediate portion with the branches is rapidly isolated by blunt dissection; the veins must sometimes be followed below the fascia and into the muscle. The main trunk is ligated above and below; the venous plexus removed; a few ligatures (two to four) applied; the corners or pockets of the wound drained with small rubber tubes; the skin closed by a continuous suture; an antiseptic dressing and firm bandage applied, and the limb kept in vertical suspension for twenty-four hours. Union generally occurs by first intention. The symptoms of the varicose condition, the feeling of fatigue, the pain, the muscular cramps, etc., as well as the eczema and ulceration, are usually entirely cured.

#### THE SURGERY OF THE SPINE.

DR. J. WILLIAM WHITE (*The Annals of Surgery*, July, 1889) reviews the history of spinal surgery from early times to the present day, discusses the arguments for and against operation in the three great classes of spinal disease, in which operative interference may be thought of—viz., traumatism, caries, and neoplasms—and comes to the following conclusions:

1st. The objections urged against operative interference in spinal traumatism were partly theoretical—hemorrhage, frequency of absolute destruction of the cord, pressure from inaccessible fragments of bone, etc., and have been shown to be unsupported by clinical facts; and were largely due to a well-grounded dread of, (a) the shock, in those cases operated on in pre-anæsthetic times; and, (b) consecutive inflammation, suppuration, and pyæmia in pre-antiseptic periods. The later results, which now constitute our only safe basis for generalization, are distinctly encouraging, and resections of portions of the vertebra, in fractures, possibly even in dislocations, should be recognized as an eminently proper operation, and in suitable cases altogether warranted by the facts in our possession; and, further, such cases are by no means rare or exceptional.

2d. There can be still less doubt that the testimony of both pathologists and practical surgeons indicates that the causes of the paralysis of Pott's disease is in many instances an extra-medullary proliferation of connective tissue, assuming the density and proportions of a neoplasm, occupying the space between the dura and the anterior surface of the lamina, not apt to be

associated with intra-medullary changes or with destructive degeneration of the cord, and very frequently removable by operation.

3d. Every case of focal lesion thought to depend on a tumor and not distinctly a malignant and generalized disease, should be regarded as amenable to operative interference, no matter how marked the symptoms of pressure may be, nor how long continued.

4th. The method of extension as recently revived is well worthy of preliminary trial in the first two classes, and in obscure cases thought to belong to the third class. It has not yet been tried in a sufficiently large number of cases to establish its exact limitations, but it is unquestionably a therapeutic measure of vast importance in spinal injury and disease.

5th. It is customary and proper in deciding upon any serious surgical procedure, involving risk to life, to consider well the prospects of the patient in the event of non-interference, and to be largely influenced by them. Looked at in this light, the surgery of the spine, as regards traumatism, caries, and neoplasm, may fairly be said to have a rapidly widening field, and to deserve more serious and careful consideration by practical surgeons than it has received for many years.

Drs. F. X. DEBECUM and J. WILLIAM WHITE (*Ibid.*, June, 1889) reported two cases of resection of the spine. One died soon after, but the other, who had been for many months a hopeless paralytic, and who was rapidly failing in general health before the operation, is now (October 6, 1889) walking about the ward unassisted and in excellent general condition.

#### OBLIQUE OSTEOTOMY FOR ANTERIOR CURVATURE OF THE TIBIA.

DR. JOSEPH COLLIER describes as follows (*The Medical Chronicle*, August, 1889) the operation which he prefers in exaggerated cases of tibial curve. It was originally proposed by Mr. Gowan. Neither Esmarch nor tourniquet is required, as the bleeding is only slight, and what little does occur is useful in keeping, by its flow, the wound clean during the operation. The position of the centre of the osteotomy should be at the middle of the convexity of the bone. A tenotomy knife is entered at the anterior border of the tibia and passed under the skin across the subcutaneous surface of the bone and then withdrawn. An Adams's saw is introduced through the puncture and made to follow the track of the knife. The tibia is then sawn through obliquely in a direction from above and within downward and outward. The skin is tolerably movable on the front of the shin, so by pulling it up on entering the saw and gradually dragging it down as we get lower with the oblique division of the bone, it is possible to do the operation through merely a skin puncture. The amount of obliquity must depend on the amount of curve and flattening. If these be at all great—as, for instance, if in a child of from seven to nine years the point of greatest convexity be over two inches in front of the normal—then the obliquity required will be in a line forming an angle of about 60 degrees with the horizontal. In most cases it is good to divide the fibula as well, and this may be done with the saw either through a separate puncture or through the puncture used for division of the tibia by first reëntering the tenotomy knife and passing it through the soft parts to the external surface of the fibula. Lastly, the tendo-Achillis is to be subcu-

taneously divided; it is in every case well to do this, as it enables the deformity to be more easily removed; it relieves tension and pain after the operation, and lessens the tendency to displacement during repair. The tibia should be sawn through, or almost through, for if much bone is left to be fractured, it may break irregularly and projections may interlock and prevent good positioning.

Such an oblique osteotomy as the above, by allowing the lower fragment of the tibia to slide up, as so often happens in oblique accidental fracture of that bone, and especially by allowing an antero-posterior movement of the fragments upon one another in a transverse horizontal axis, will be found to permit a ready and complete reduction of the deformity. The wound having been dressed, the limb should be put up in a back and side splint. It should be taken down at the end of from a week to ten days, when the wound will be found healed; under an anæsthetic the limb may then be moulded into accurate position and fixed in plaster-of-Paris. Any little projection from the sliding up of the lower fragment will soon be absorbed and disappear. If the curve has been excessive, the removing of the deformity in this special manner will of necessity leave the limb with a little possible hyper-extension.

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#### THE EFFECT OF THE ENTRANCE OF AIR INTO THE CIRCULATION.

DR. H. A. HARE (*The Therapeutic Gazette*, September 16, 1889) has made a series of experiments which, he claims, show that the admission of air to the jugular vein is not dangerous unless it is in enormous quantities, while, on the contrary, a much less amount injected into the carotid artery causes death. His theory as to why air injected into the jugular vein is not followed, unless in excess, by bad symptoms, while the same doses kill when sent into the carotid artery, is, that the air in small amount on entering the right side of the heart is, when sent through the pulmonary bloodvessels, expired with the rest of the gases therein contained; and it is only when so large an amount is injected that some of it reaches the left side of the heart that death ensues, owing to the formation of minute clots which act as emboli. That such clots are not formed in the jugular vein he thinks probable from the results reached and from the fact that venous blood coagulates more slowly than arterial blood. The injection of large amounts of air into the carotid where arterial blood is present may cause clots and resulting emboli—a theory, he thinks, still further supported by the symptoms of paralysis or spasm shown by the animals used. It can hardly be supposed that air is a poison in itself to the brain and its centres, particularly the respiratory centre. His conclusions are that—

1. Death never occurs from the entrance of air into the ordinary veins of the body, unless the quantity be enormous—from one to several pints—a quantity which cannot enter unless deliberately sent in by the surgeon.

2. The cases on record have been due to other causes than air, and have not been proved.

3. The tendency of the vessel to collapse and the leakage of blood prevent entrance of air, and it would seem probable that a clot has generally caused death, not the air itself.

[These results are contradictory to those reached by SENN in an elaborate experimental and clinical study of this subject (*Trans. of the Amer. Surg. Association*, vol. iii., 1885), and are directly opposed to hitherto published clinical cases. Among the conclusions reached by Senn were the following: Clinical experience and experimental research teach us that when a certain amount of air enters the right side of the heart, death invariably takes place in a very short time. Insufflation of a fatal quantity of air into a vein produces death by—*a*, mechanical over-distention of the right ventricle of the heart and paralysis in the diastole; *b*, asphyxia from obstruction to the pulmonary circulation, consequent upon air-embolism of the pulmonary artery. Insufflation of the same quantity of air into arteries is *less* dangerous than when introduced into veins.—ED.]

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## OPHTHALMOLOGY.

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UNDER THE CHARGE OF

GEORGE A. BERRY, M.B., F.R.C.S. EDIN.

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### OPHTHALMIA PHOTO-ELECTRICA.

The last number (May-June) of the Russian *Vestnik Ophthalmologii* contains an interesting treatise by DR. LYOUBINSKY on the little-known affection of the eyes which is produced by incautious exposure to a strong electric light. Until the electric light came into use strong sources of illumination did not constitute any factor of etiological importance in the production of eye diseases; hence the subject is one which has only comparatively recently received attention. Those suffering from the effects of exposure to the strong light are almost exclusively professionally connected with electric lighting.

Dr. Lyoubinsky, practising as he does at Cronstadt, has had unusual opportunities of seeing what he has been in the habit for many years of calling ophthalmia photo-electrica. He has met with this affection thirty times, most frequently amongst officers connected with the naval school at that port. The light which has proved most particularly hurtful is the so-called "fighting light" of 14,000 candles power, the strength of which can be appreciated by the fact that it is almost impossible to look at it from Oranienbaum, a distance of seven versts (about  $4\frac{1}{2}$  miles). Dr. Lyoubinsky was consulted ten years ago as to the best means of protecting the eyes against those strong lights, and then recommended the use of dark-red spectacles which excluded the blue and violet rays. But as many men complained of discomfort from heat on wearing these spectacles, he began a series of experiments which led him eventually to advise either dark blue or dark gray glasses for those who disliked the dark red ones. The practical drill in connection with the electric light takes place during the day and lasts for an hour and a half. Those who suffer have incautiously looked at the glowing carbon for a minute or so